Interior Design for a Healthy Home

Instructional Lesson Plans

OVERVIEW: Did you know that the air inside our homes is often more polluted than the air outside, even in the most industrialized cities? Americans spend roughly 90% of their time indoors, and exposure to indoor pollutants can lead to breathing disorders like asthma and even cancer. These lesson plans are designed to help teachers incorporate healthy indoor environment concepts into Interior Design I & II courses and educate students about ways to identify, mediate, and prevent indoor health hazards.

Background:
With recent findings about the level of pollution inside many homes, people may become increasingly concerned about identifying and remedying potential threats to indoor environmental quality (IEQ). As interest in healthy indoor spaces grows, the field of interior design will need to respond to the trend. This unit is designed to introduce students to potential IEQ threats and help them understand the role that interior designers may play in creating healthier, more livable spaces.

Activity Units:

I. What do you know? Healthy Home Quiz
II. Healthy Homes Basics. IAQ video and vocabulary worksheet
III. Identifying Potential Threats. How do I tell if I have a healthy house?
IV. What can Interior Designers do? Furnishings and Finishes.
V. Healthy Home Design Presentation
VI. Assessment: Healthy Homes Quiz

Unit I: What do you know?

Activity: Take the How to Purchase a Healthy Home Quiz. Have students share answers.

Unit II: Healthy Homes Basics.

Set up: Check out the Healthy Homes tool kit from Utah House. Tell students they will be viewing a video on Indoor Air Quality (IAQ) and Healthy Home design. Make copies of the Health Home vocabulary sheet.

Doing the activity: View the video: "Home Air Care: Indoor Air & Your Health" from the American Lung Association. Ask students to keep track of threats to IAQ that an interior designer might need to know about. Ask students to come together in a group and discuss which of the topics in the video they think relate to interior design. Why? Were there any potential indoor healthy threats that were not covered? (Answer: lead paint).

LEVEL: 9-12
SUBJECTS:
Interior Design I & II
CORE CURRICULUM:
USOE Standard 20.0110-01, Objectives 01,02,03; Standard 20.0110-06, Objectives 05, 06; Standard 20.0110-08, Objectives 01, 02, 03; Standard 20.0110-09, Objectives 01, 02.
SKILLS:
Listening, observation, identification, prediction, comparison, measurement, questioning, writing, discussion, oral presentation.
LEARNER GOALS:
Students will
1. Learn about potential threats indoor environmental quality and human health.
2. Understand why it is important to consider indoor environmental quality and health when designing a home or room.
3. Explore the role that interior designers can play in improving indoor environmental quality.
MATERIALS:
Health Home Toolkit available for check out from Utah House (801)544-3089.
RESOURCES:
Healthy Indoor Air for America's Homes Program - www.healthyindoorair.org
U.S. Environmental Protection Agency Indoor Air Quality: http://www.epa.gov/iaq/

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Expansion: Where would healthy home concerns fit into Maslow's Heirarchy? (Physical, Safety and Security). What does this tell us about how important these issues might be? Are there stages in the life cycle when healthy home concerns may be more or less important to individuals? (Young children and the elderly are particularly susceptible to poor indoor environmental quality.)

Activity 2: Using information gained through the video and/or tool kit resources, have students complete the vocabulary sheet.

USOE curriculum links: Standard 20.0110-01, Objectives 01,02,03

Unit III: Identifying Threats

Activity 1: Indoor Air Quaility Assessment Checklist
Set up: make copies of the Indoor Air Quality Assessment Checklist included in your training packet.
Doing the Activity: Ask students to take the checklist home and answer the questions based on their own home. Discuss their findings in class.

Activity 2: Home Health Threat Investigation
Set up: Check out the Healthy Home tool kit from the Utah House, or gather your own materials. Set up stations with information on lead, asbestos, radon, mold, and carbon monoxide. Make copies of the "Measuring Indoor Air Quality" handout included in your training packet.

Doing the activity:

1. Split class into small groups, and assign each group one of the stations.
2. Give each student a copy of "Measuring Indoor Air Quality" and ask each group to answer fill out the "Identifying Threats to a Healthy Home" worksheet for their topic.
3. Bring groups back together to report their findings.
4. Discuss why an interior designer might need to be able to identify these home health threats. (All are important considerations when remodeling older homes, and knowing how to identify them will help interior designers, homeowners, and workers avoid exposure to these threats.)

Expansion: Ask students to imagine they are buying a new home. Would knowledge about the indoor environmental quality of a home influence their decision making process? Why or why not?

USOE curriculum links: Standard 20.0110-01, Objective 03.

Unit IV: What can Interior Designers do?

Background: The IEQ threats investigated in Unit three are important considerations for interior designers involved in remodeling. Biological pollutants and Volatile Organic Compounds (VOCs) may also pose a danger to overall home health during renovation or new construction. These are particularly important areas of understanding for interior designers because they are directly related to interior furnishings and finishes. This activity will focus on ways to reduce the biological pollutants and VOCs in a home through selection of furnishings, flooring, and finishes.

Activity 1: The Nose Knows
Set up: Check out the Healthy Home Toolkit from Utah House or gather materials yourself. Open and set up 10 paint, glue, and stain samples with differing VOC contents. VOC content will be listed on the back of the can. Low or no-VOC products can be found at environmental building supply stores or through many major paint manufacutors. WARNING: do not use products that exceed 250 grams per liter of VOCs or recommend respirator use during application.

Place paper covers over the cans so that the labels are covered. Mark each with a number 1 through 10. Make copies of the "Nose Knows" worksheet.

Doing the Activity:

1. Ask students if they have ever been in a newly painted room, or one where new carpet has just been installed. How did it smell? How did it make them feel?
2. Explain that many home decorating items, like paints, glues, carpet, furnishings, particle board, and medium density fiber board (MDF) contain chemicals that can be released into the home. These chemicals are called Volatile Organic Compounds or VOCs, and they cause the strong smell in new paints, furnishings, and carpets. Many VOC's are known carcinogens (cancer causing agents) at very high levels of exposure. The health effects of prolonged exposure to low concentrations is still unknown. However, some people with asthma, other breathing problems, or chemical sensitivity may experience problems at low levels.
3. Tell students that one of the best measures of VOCs is the human nose. Ask them to smell each of the numbered samples and rank the level of odor.
4. Once everyone is done, pull off the labels and show the students where to find the VOC content listing on the label. How accurate was the nose test?
5. Compare the finish of the various paints. How do no-VOC paints compare to the regular ones? How do you think the prices compare?

Expansion: Paints and adhesives are not the only sources of VOCs to consider when choosing interior materials. Carpets, pressed wood furniture and cabinets, and some upholstery can also out gas. Using the information materials in the toolkit, discuss furniture and flooring options that can improve IEQ. Also discuss options for reducing biological pollutants and allergens (example: select hard surface flooring instead of carpet).

USOE curriculum links: Standard 20.0110-06, Objectives 05, 06; Standard 20.0110-08, Objectives 01, 02, 03

Unit V: Healthy Home Design

Background: This unit is designed to synthesize everything students have learned about Interior Design strategies for Healthy Homes. If a full room design presentation will not fit with existing class requirements, a simple list of design elements to be considered can be substituted.

Activity 1: Healthy Home Room Design Presentation
Set up: Check out a Health Homes tool kit from Utah House or gather the following materials: books on Healthy Home design (preferably with inspiring photos), magazines that focus on healthy interior design, and samples of hard surface flooring, low VOC paints, hardwood cabinetry, etc.

Doing the Activity:

Split class into pairs. One student will play the role of a potential client who has a breathing disorder and numerous allergies and is interested in healthy home design. The other student will play the role of the interior designer, seeking to meet the client's needs.

The student playing the client should create a written list of his/her needs for a specific room in the home and questions to ask the interior designer.

The student playing the interior designer will need to take the client's list of questions and begin researching ways to meet the client's health needs. The client should also do research on the topic and come up with ideas.

Together, the client and interior designer will create a poster presentation of a "healthy" room design which meets the client's original needs. Have each team present to the larger class. The final product should be submitted to the teacher along with the original list of needs and all research notes.

Note: this is a great place to incorporate all the course's design elements, not just healthy homes concerns. Are the trade offs that have to be made for a healthy home design?

USOE curriculum links: Standard 20.0110-09, Objectives 01, 02.

Unit VI: Assessment

Take the How to Purchase a Health Home Quiz again. Compare the results with the pre-test taken in Unit 1. Did student's knowledge increase?

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The Nose Knows

Directions:
Use your nose to smell each of the containers on the table. For each numbered container, rank the strength of the odor you smell from 0 (no odor) to 10 (extremely strong odor). Mark your ranking on the scale provided.

Container 1: 0 - - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - - 8 - - - - 9 - - - - 10

Container 2: 0 - - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - - 8 - - - - 9 - - - - 10

Container 3: 0 - - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - - 8 - - - - 9 - - - - 10

Container 4: 0 - - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - - 8 - - - - 9 - - - - 10

Container 5: 0 - - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - - 8 - - - - 9 - - - - 10

Container 6: 0 - - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - - 8 - - - - 9 - - - - 10

Container 7: 0 - - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - - 8 - - - - 9 - - - - 10

Container 8: 0 - - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - - 8 - - - - 9 - - - - 10

Container 9: 0 - - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - - 8 - - - - 9 - - - - 10

Container 10: 0 - - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - - 8 - - - - 9 - - - - 10

Remove the covers and look for the VOC content listed on the container labels. Is there any correlation between the strength of the odor and the level of VOC content? Also, look at the warnings posted on some of the labels. What do you notice about them?

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Identifying Threats to a Healthy Home

Directions:
In your small group, look through the materials provided by your teacher on one specific threat to indoor environmental quality. Answer the following questions then report your findings to the class.

Where is this particular threat most commonly found in the home?

Does it exclusively effect homes built before a certain year?

Can this threat be remediated by a homeowner, or is a professional required?

What steps should be taken if this threat is found in a home?

What can be done to prevent this threat from occuring in the home?

What are the potential human heath effects associated with exposure to this threat?

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Vocabulary Worksheet

Using the internet, materials in your school's library, or information in the Utah House Healthy Home Toolkit, write a brief definition of each of the following terms.

Indoor Air Quality (IAQ)

Indoor Environmental Quality (IEQ)

Lead

Radon

Asbestos

Combustion Pollutants

Biological Pollutants

Volatile Organic Compounds (VOCs)

Remediation

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How to Purchase a Healthy Home

Quiz

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1. Name one place you might find asbestos in your home.

2. TRUE or FALSE: Lead-based paint is found only in pre-1958 housing.

3. TRUE or FALSE: Formaldehyde is commonly found in house paint.

4. TRUE or FALSE: Radon is only found in new homes.

5. Name two combustion pollutants that can affect your home's indoor air.

6. Health effects from indoor air contaminants often mimic other diseases. Name one clue that can be used to help determine if poor indoor air quality could be the cause of adverse health symptoms.

7. Name one pollutant that can be found in water.

8. What type of indoor air pollutant can cause asthma attacks?

Answers to Quiz

1. Name one place you might find asbestos in your home.
   a. Insulation around pipes, duct wrap, vinyl floor tiles and spackling, roof and side shingles, floor tiles, soundproofing materials, heating ducts and flues, textured ceilings, decorative finishes.

2. TRUE or FALSE: Lead-based paint is found only in pre-1958 housing.
   a. FALSE, until 1978 lead-based paint was used.

3. TRUE or FALSE: Formaldehyde is commonly found in house paint.
   a. FALSE

4. TRUE or FALSE: Radon is only found in new homes.
   a. FALSE

5. Name two combustion pollutants that can affect your home's indoor air.
   a. Carbon monoxide, nitrogen dioxide, sulfur dioxide, tobacco smoke.

6. Health effects from indoor air contaminants often mimic other diseases. Name one clue that can be used to help determine if poor indoor air quality could be the cause of adverse health symptoms.
   a. Symptoms only occur in home and occur when you leave, others have similar symptoms, sources for pollution are present.

7. Name one pollutant that can be found in water.
   a. Bacteria, viruses, nitrate, lead, copper

8. What type of indoor air pollutant can cause asthma attacks?
   a. Biological contaminants

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